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10 October 1973

Study of Recreational Land and Open Space  
Using Skylab Imagery  
Monthly Progress Report, September, 1973

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Study of Recreational Land and Open Space  
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Monthly Progress Report, September 1973

Photography taken with the S190A Multispectral Photographic Camera was received by the Principal Investigator on 10 September 1973. During the September reporting period, this photography was examined to determine the types of features which can be recognized. This examination was performed by the Principal Investigator and by Mr. Shan G. Topiwalla, a member of the staff of the Oakland County Planning Commission.

Since the major emphasis of this project is on the development of computer processing techniques for use with the S192 system, no special processing of the multispectral photography was attempted beyond the preparation of 14.4 enlargements of the 70 mm transparencies to produce prints at 1:200,000 scale. Image interpretation on the individual transparencies from various camera stations was also conducted using an 8X magnifier. The objective of the interpretation was to ascertain which urban and natural resource features can readily be identified without repetitive use of auxiliary information.

Interpretation Procedures and Results

The image interpretation exercise was concentrated on one frame of the data. The coordinates of the center of this frame are 42:6.5 deg. N. latitude and 83:31.8 deg. W. longitude. The photography was taken on 12 June 1973 at approximately 9 AM EDT. This frame includes the western shoreline of Lake Erie and areas inland from the shoreline to a distance of about 60 miles. About 30% of the northwest part of Oakland County is cloud-covered, and there appears to be a light haze over the remainder of the county. Some other sections of the frame also exhibit cloudiness or haze, but certain sections are clear, notably in Washtenaw County.

The individual transparencies from the various camera stations were examined at 8X magnification. The color infrared photograph clearly shows such linear features as major highways, major traffic arteries in Pontiac and other cities, and airport runways. It is also possible to determine the general outlines of subdivisions, agricultural fields, golf courses, shopping centers, industrial complexes, sand and gravel pits, and central business districts. However, these features cannot be completely identified without auxiliary sources of information. Bare soil is easily distinguished from vegetation cover, but the color IR does not have enough detail to separate crops, woodlands, or other major classes of vegetation, at least for the sizes of these features found in Southeast Michigan.

103300-11-L

The 0.8 - 0.9 micrometer bandwidth emphasizes water bodies. Lakes as small as 1 hectare can be detected. The 0.6 - 0.7 micrometer bandwidth provides the sharpest definition of features. Although water bodies are relatively difficult to distinguish on the basis of tonal variations in this band, other features stand out sharply. It is possible, for example, to discriminate individual streets in subdivisions. In the clear area of Toledo, it is possible to see bridges over the Maumee River.

#### Strip Development

The extent of strip developments consisting of industrial, commercial, and some multi-family residential establishments can be delineated from 0.8-0.9 micrometer imagery. Major arteries appear to be defined by dark gray linear features. These features are not continuous as major road arteries should be. This is explained by an examination of land uses along Telegraph, Woodward, Eight Mile and Maple Roads in Oakland County, which indicates that strip developments along most major arteries occur discontinuously. A comparison of the 0.8-0.9 micrometer imagery with the land use map reveals that the dark gray linear returns match those sections of major arteries that have strip developments along them, for example, along Telegraph Road in Oakland County between Eight Mile and Twelve Mile roads. The segment of Telegraph Road between Twelve Mile and just south of Fifteen Mile roads, where there is no strip development, is not defined on the imagery.

#### New Construction

Large scale new construction is identifiable on color IR and on 0.6-0.7 micrometer bandwidth imagery. The I-275, I-696, I-96 interchange in Novi in Oakland County is in its early phases of construction. The lighter tonal returns on color IR and 0.6-0.7 bandwidth imagery define the general design of the interchange. I-696 east of I-75 in Oakland and Macomb counties and I-96 (Jeffries Freeway) in Detroit and Wayne County under construction, are easily separable from the existing freeway network. The large Briarwood Shopping Center being built at the south edge of Ann Arbor is also clearly visible.

#### Golf Courses

Thirteen golf courses were identified in Oakland County on 0.8-0.9 bandwidth imagery. A county land use map shows fifteen golf courses within the area interpreted. All golf courses in urbanized areas can readily be identified by their comparatively light tonal returns. The two golf courses not identified are in rural areas surrounded by open fields and woodlands.

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### Water Features

Water bodies are clearly defined on 0.8-0.9 bandwidth imagery. The approximate extent of wetlands can be determined with intensive interpretation. Major streams can be observed. Lakes as small as 1 hectare can be detected and the general shape of individual lakes as small as Pleasant Lake (about 2 hectares) can be delineated. For the larger lakes, (e.g., 30 to 40 hectares), it is possible to distinguish shallow areas from deeper areas.

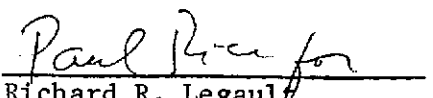
### Conclusions

The preliminary examination of S190A imagery indicates that large numbers of urban features and natural resources can be grossly identified in conjunction with varying amounts of supplementary information. Also certain elements of metropolitan land use, such as golf courses, strip developments, new construction, and lakes, can be identified with sufficient accuracy to conduct regional level inventories of these features. However, the resolution of S190A photography would limit these studies to rather general identification of recreational sites or delineation of open space. A more complete evaluation of the use of EREP data must await the receipt and analysis of S190B and S192 data.

Submitted by:

  
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